

WINDOWS XP PROFESSIONAL FAULT TOLERANCE

**After reading this chapter and completing the exercises,
you will be able to:**

- ◆ Define IntelliMirror technology and describe its key features
- ◆ Back up data and settings on Windows XP Professional
- ◆ Recover a Windows XP Professional client's applications and data
- ◆ Use the emergency repair process
- ◆ Perform preventive maintenance
- ◆ Install and use the Recovery Console
- ◆ Describe remote operating system installation and how it can be used with IntelliMirror to recover an entire PC remotely

Disaster recovery involves minimizing the amount of time a computer is nonfunctional in the event of a disaster, which can include anything from corrupt system files to a hardware failure. Although Windows XP includes several disaster recovery features, Microsoft IntelliMirror technologies and built-in backup mechanisms help to minimize the chances of such a loss. IntelliMirror and new and enhanced disaster protection and recovery options allow Windows XP Professional users and system administrators to rest assured that their information and configurations are backed up and ready to be restored at a moment's notice. This chapter discusses IntelliMirror and backup technologies, as well as various disaster recovery methods, including remote OS installation.

MICROSOFT INTELLIMIRROR

IntelliMirror is a term used to describe features of Windows XP that help ensure the availability of a user's data and computer configuration. The following list includes the three key elements of IntelliMirror and an explanation of how each relates to disaster protection and recovery:

- *User data management*—Data backup
- *User settings management*—PC configuration recovery
- *Software installation and maintenance*—Application installation and repair

IntelliMirror greatly reduces the need for and cost of administrative intervention. Therefore, it plays a crucial role in both disaster protection and disaster recovery. If for any reason a user loses data or deletes required operating system or application files, that information can be recovered easily, sometimes seamlessly, with little or no action by an administrator. At the same time, the administrative group's central administration capabilities allow it to manage users' machines centrally. Therefore, both end users and the administrative team benefit.

DATA BACKUP

As users work at various computers on a network or take their computers home, IntelliMirror can manage their documents and data for them. If a user's machine crashes, or the user is away from his or her computer unexpectedly, the user will still have access to any needed data. Using the user data management feature of IntelliMirror also means that if a user's data is corrupted on one machine, it can be restored using the copy of the data on the network.

IntelliMirror technologies in Windows XP enable users to store and synchronize their data easily in a specified network location. **Folder redirection** can be completed seamlessly through the use of a group policy, or a user can set it up manually (see Figure 14-1). Typically, a user's My Documents folder or other important data folders are redirected to a share on a Windows Server on the network. In this case, when a user on the network saves a document to the My Documents folder, it is automatically saved not only on the local machine but also on the network share. If the user is not on the network, the document is saved only to the user's hard drive. This process is part of Windows XP's Offline Files feature, discussed in detail in Chapter 4, "Managing Windows XP File Systems and Storage." When the user rejoins the network, the local version of the document automatically synchronizes with the network version (see Hands-on Project 14-1). If the network version of the document also has been modified during that time, the user is prompted as to whether to overwrite the local version, overwrite the network version of the document, or save both copies of the document. To synchronize a file or folder manually when a user rejoins the network, he or she can highlight the file or folder to be synchronized in Windows Explorer. Then the user must select Synchronize from the Tools menu.

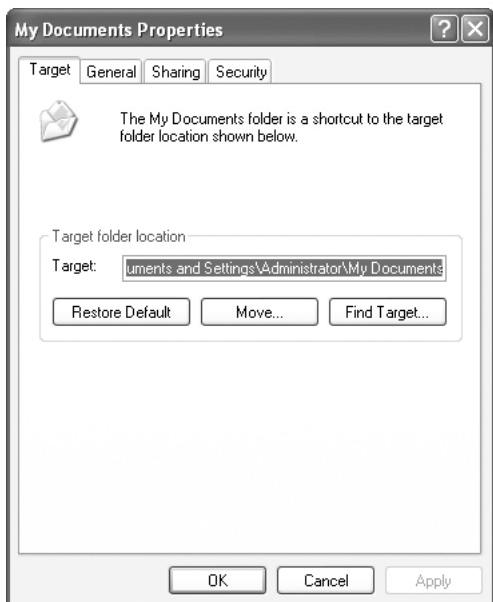


Figure 14-1 The My Documents Properties dialog box, Target tab

If one of the copies becomes corrupt or is missing, it is automatically restored from the existing version of the document. This recovery is transparent to the user.



Administrators must consider the cost of hardware and maintenance of the servers that back up user data. A network's bandwidth could also be affected by the synchronization of user data; that is, the synchronization process can increase network traffic, thus slowing down the network.

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PC Configuration Recovery

Personalized machine settings can be accessed by Windows XP Professional users from whatever machine they use on the network, through the user settings management feature of IntelliMirror. Therefore, if a user's machine crashes or is unavailable, its user environment configuration can be easily transferred to a new machine. Personalized settings are customizations of the operating system and applications, including language settings, desktop schemes, and custom dictionaries, and are provided to users when they log on to the system, regardless of which physical computer they use. Essentially, this is the same thing as a roaming profile.

Application Installation and Repair

If users inadvertently remove essential application or system files, or if their systems crash, they can use the software installation and maintenance feature of IntelliMirror to

rebuild their machines with the same applications they had previously. By using the **Windows Installer Service (WIS)**, they can reinstall their applications and repair applications seamlessly (see Hands-on Project 14-2 to change or remove an application using the Add or Remove Programs applet in the Control Panel). Restorable applications include software, software upgrades, and even operating system upgrades.



Windows Installer can also be used to create a software package for end users. Review Windows XP Help and Support and the *Windows XP Professional* and *Windows .NET Server Resource Kits* for additional details.

The Windows Installer program is included with Windows XP, as it was with Windows 2000, as `msiexec.exe`. This command-line tool is used to install and configure software (with the `/i` parameter), repair software (`/f`), uninstall software (`/x`), apply patches (`/p`), and more. Windows Installer can apply three types of software packages to a system: `.msi` (software installation), `.msp` (patches, service packs, and software updates), and `.mst` (transformation or modification files, used to customize an installation). These installer packages can be found in the distribution set of many full-size applications, such as Microsoft Office XP. You can also create custom installer packages using third-party tools, such as VERITAS WinINSTALL LE, InstallShield, Wise Solutions, or Microsoft Visual Studio Installer.

Most of the `msiexec` functions are performed using a simple single parameter syntax. For example, installing a program can be performed using `msiexec /i gensoft.msi`. However, repairing software using `msiexec` is a bit more complex. There are 10 types of repair actions `msiexec` can use against a software product, these include reinstall if file is missing (`p`), reinstall if file is missing or a different version is installed (`d`), force all files to be reinstalled (`a`), and rewrite all requires user-specific Registry entries (`u`). These additional syntax elements for repairing are added onto the `/f` repair parameter, such as `msiexec/fdu gensoft.msi`.

MICROSOFT BACKUP UTILITY

Microsoft IntelliMirror technologies are quite effective in backing up user data, applications, and personalized settings, using network shares and policies. However, there are also methods of backing up a PC by using external tools:

- Tape drives
- External hard disks (i.e., network drives)
- Zip or Jaz drives
- Recordable CD-ROM drives
- Logical drives

The **Backup utility** in Windows XP provides the easiest method of backing up or restoring data (including the system configuration) onto any one of these media or onto a server on a network (see Hands-on Project 14-3). There are three main functions

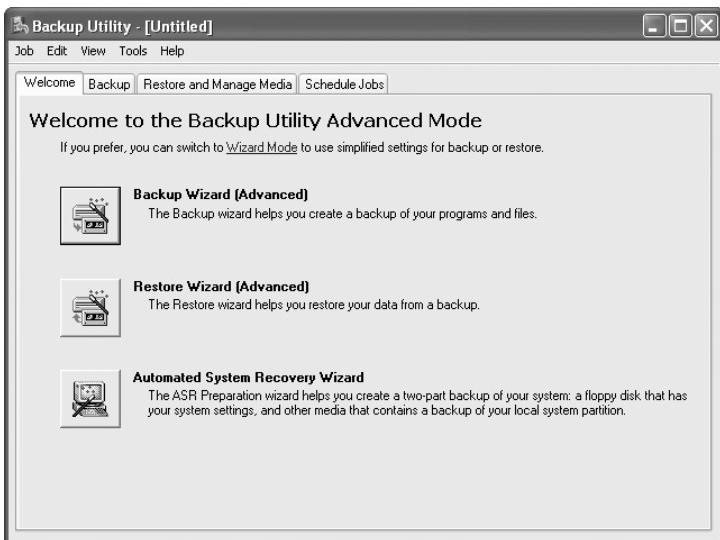
within Backup (located on the Welcome tab of the Backup utility, and accessed by clicking the labeled button):

- Back up programs and files
- Restore programs and files
- Create an ASR (Automated System Recovery) data set

Figure 14-2 shows the Welcome tab of the Backup Utility. Using this tool is a good precautionary element in the disaster recovery process. The restore and repair options are discussed later in this chapter.



The Windows XP Professional native Backup tool is similar to the one in Windows NT and Windows 2000, but is significantly different from the versions in Windows 98, 98 SE, and Me. The backup media sets created by Windows 98's Backup utility are incompatible with the Backup utility found in Windows XP, NT, and 2000. Thus, the only method by which you can extract data from a Windows 98 backup media for a Windows XP system is to perform the restore from a Windows 98 system and move the files to the Windows XP system.



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Figure 14-2 The Welcome tab of the Backup Utility

The Backup utility provides two methods to back up your data. You can use the Backup Wizard, or you can click the Backup tab to set your backup options manually (see Figure 14-3). The Wizard guides you through the process of defining and scheduling (if necessary) your backups and is launched automatically by default when you open the Backup utility. Hands-on Project 14-4 provides instructions on using the Backup Wizard to schedule a backup.

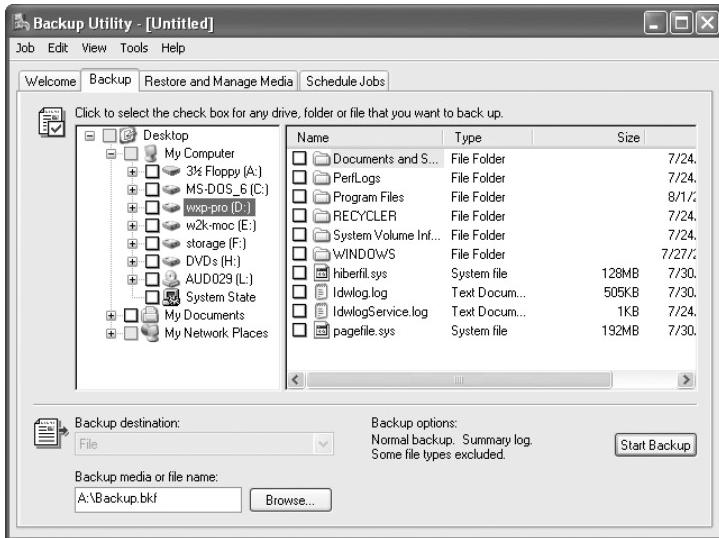


Figure 14-3 The Backup tab of the Backup Utility



You must be an Administrator or a member of the Backup Operators group to back up or restore non-personal files using the Backup utility.

To start the Backup utility, select Start | All Programs | Accessories | System Tools | Backup (alternately, you can select Start | Run, then type *ntbackup*, and press Enter). Then you must choose what to back up. You can back up everything on the computer or just specific files and folders. You can also elect to include the **System State data**, which includes the system's boot files, COM settings, and Registry data.

In addition to choosing what to back up, you can also specify the **backup type**:

- ***Copy backup***—Backs up all selected files but does not mark them as being backed up (i.e., the archive bit is not cleared)
- ***Normal (or full) backup***—Backs up all selected files and marks them as being backed up (i.e., the archive bit is cleared)
- ***Daily backup***—Backs up only the selected files that have been created or modified the day that the backup is being performed but does not mark the files as being backed up (i.e., the archive bit is not cleared)
- ***Differential backup***—Backs up only the selected files that have been created or modified since the last full or incremental backup but does not mark the files as being backed up (i.e., the archive bit is not cleared)
- ***Incremental backup***—Backs up only the selected files that have been created or modified since the last normal or incremental backup and marks the files as being backed up (i.e., the archive bit is cleared)



When you use the Backup Wizard and choose either "Back up everything" or "Back up selected files," the backup type defaults to Normal or Incremental, respectively. You can change the backup type from the Completing Backup Wizard screen by clicking the Advanced button.

As previously mentioned, backing up the System State data protects the Registry, the COM+ Class Registration database, and system boot files. By backing up these files, you can restore your PC's configuration to its original state if necessary. If you back up to a network drive, you must have a system boot disk with network drivers in order to attach to the network share and restore files.



When the System State data is backed up, a copy of your Registry files (default, SAM, SECURITY, SOFTWARE, and SYSTEM) is also saved in the \WINDOWS\Repair\ Regback directory. Advanced users can use these files to restore their Registry files manually without restoring the entire System State. (See Chapter 12, "Working with the Windows XP Registry," for more information.)

Automated System Recovery (ASR) can restore essential system files in the event of a severe system failure. ASR won't protect your personal data or even application configuration settings; it creates a backup of only those files essential to the boot process. The ASR media set consists of a backup floppy and one or more backup tapes or other media. To restore a system using ASR, boot using the original system CD or the boot floppies. When prompted, press F2 to initiate the ASR restore process, and provide the ASR floppy and the backup media when requested. ASR is accessed on the Welcome tab of the Backup utility by clicking the ASR button.

PREVENTIVE MAINTENANCE

Windows XP includes several mechanisms to reduce the number of problems commonly experienced by users. These range from removing bad device drivers to installing system updates. Each of these useful mechanisms is covered in the following sections.

Device Driver Rollback

You should already be familiar with the concept of device driver signing from Windows 2000 and its discussion in Chapter 3, "Using the System Utilities." A new feature of this technology to help prevent problems related to faulty device drivers is the ability to roll back device drivers. Device driver rollback removes the current driver for a device and re-initializes the previous driver, which Windows XP retained when the new driver was installed. To use device driver rollback, open the Driver tab (see Figure 14-4) of a device's Properties dialog box (typically through the Device Manager) and click the Roll Back Driver button.

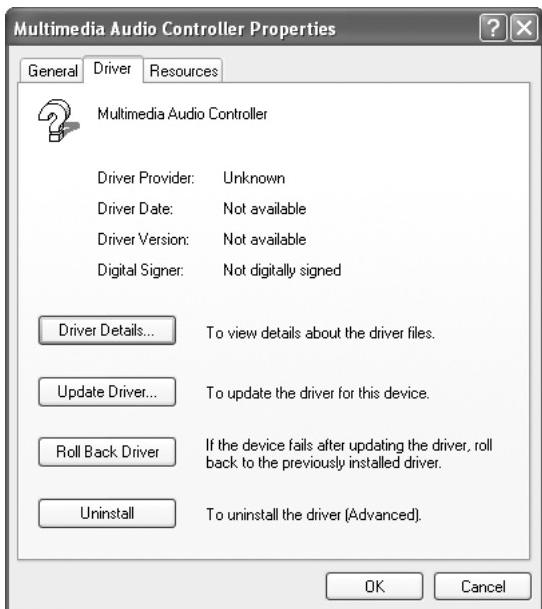


Figure 14-4 The Driver tab of a device's Properties dialog box

Windows File Protection

Windows File Protection (WFP) was included in Windows 2000 and has been retained by Windows XP. WFP ensures that the correct and uncorrupted version of certain core files are retained on the system at all times. These files include .sys, .dll, .exe, and .ocx files native to Windows XP and several True Type font files that are critical to system operation. Native files are those included on the original distribution CD or those updated by Microsoft-approved and distributed updates and service packs.

WFP protects its list of sacred files from changes due to application installation, virus infection, and even human error. WFP works in the background, watching for attempted writes to its monitored files. If a write occurs, the resultant file is compared to its signature in a database of known files. If there is a mismatch, the altered file is replaced. The replacement file is pulled either from the WINDOWS\system32\dllcache folder, the original distribution files from the Windows XP Professional CD, a local copy of this CD, or on a network share. WFP operates invisibly to the user in most cases. In the event of a change to a critical core file, you might be prompted to reboot.

The key to the operation of WFP is the System File Checker (SFC) tool, which actually performs the inspection and replacement of monitored files. Although WFP uses SFC automatically when needed, SFC also can be executed manually from a Command Prompt. All of its parameters and syntax can be accessed by issuing the "SFC /?" command. In addition to inspecting and replacing suspect files, it can also be used to purge and rebuild the DLLCACHE and set the size of the DLLCACHE folder. By default, this folder has a limit of 50 MB.

Automatic Updates - Windows Update

Even after the final release of a product, Microsoft continues to improve the code by fixing problems. Such code is made available online and can be accessed through the Windows Update command from the Start menu and the Tools menu of Internet Explorer. Windows XP has improved upon software update functionality by offering a configuration for updating the system. The Automatic Updates tab of the System applet is used to define whether the OS automatically checks, downloads, and installs updates, notifies you when updates are available, or leaves all updating processes up to you to perform manually.

When you choose manual or notify, you reserve the option to refuse or decline offered updates. If you decline an update, this tab offers the ability to re-access or restore declined updates.

The first time an update is available on the Windows Update Web site, Windows XP prompts you to configure how these updates are handled: automatic installation, notify, or manual only.

Desktop Cleanup Wizard

The Desktop Cleanup Wizard is nothing more than a nag that asks your permission to remove unused icons from the desktop. This tool launches automatically every 60 days and prompts you to allow it to move all icons that have not been used in the last 60 days to the Unused Desktop Items folder, which is added to your desktop after the first item is moved.

This feature can be disabled by opening the Display applet, selecting the Desktop tab, clicking Customize Desktop, selecting the General tab, then deselecting the Run Desktop Cleanup Wizard every 60 days checkbox.

Hibernate vs. Standby

Hibernate and standby are commonly used terms or features that often confuse users. Windows XP supports both, so it is a good idea to understand them clearly. Hibernation under Windows XP saves the contents in memory to the hard drive and performs a system shutdown. Upon reboot, the system is restored to its state at the moment hibernation was activated. If the user account is protected by a password, you are prompted to provide it before access to the system is restored. Hibernation restores the user environment to its exact state, including open applications and dialog boxes.

Standby is a feature added to a system through support for APM (Advanced Power Management) or ACPI (Advanced Configuration and Power Interface). Typically, one or both of these is supported by notebook or portable systems; however, there are now many desktop systems that support these power-saving options. Standby retains the contents of memory in RAM instead of saving it, allowing for very fast restoration to the user environment. However, if the system loses power, the data saved in RAM is lost;

upon the next reboot, a normal system boot occurs. If power is maintained, the stored user environment is instantly restored when the user reactivates the system (with either a quick press of the power key, pressing a key, or just opening the display lid). If the user account is protected by a password, you must provide it before access is granted.

Standby mode can be configured to begin automatically when you close the display lid of your notebook computer.

When shutting down a domain client system, hibernate and standby options (if supported by the system) appear in the pull-down list on the Shut Down Windows dialog box. The Shut Down Windows dialog box appears when the Start|Shut Down command is issued. On non-domain clients in Welcome screen logon mode, only the Start, Turn Off Computer command reveals a three-button dialog box. The first button displays hibernate or standby. If your system supports both, you must press Shift to switch the button to the other feature.

REPAIRING WINDOWS XP PROFESSIONAL

Although disaster prevention is important, you still need to be prepared for the worst. If system files become corrupt or are accidentally deleted, or if certain drivers or services are keeping the operating system from loading, you have several options for repairing or restoring your PC:

- Safe Mode (discussed in Chapter 13, “Booting Windows XP”)
- System Restore
- Recovery Console
- Emergency repair process
- Remote OS installation

System Restore

Windows XP boasts a new mechanism for maintaining a functioning user environment: System Restore can be used to return the OS to a previously saved state. It can reverse system configuration settings and Registry changes or even undo the changes made by installed software, all without altering personal files or e-mail. System Restore can undo a botched alteration if you can gain access to the System Restore interface. If you cannot boot the system, you’ll need to employ some other recovery technique.

Basically, System Restore automatically creates restoration points during critical system changes. You can even initiate the creation of a restoration point manually. System Restore is controlled and managed through two Interfaces: the System Restore tab of the System applet and the System Restore tool (see Figure 14-5).

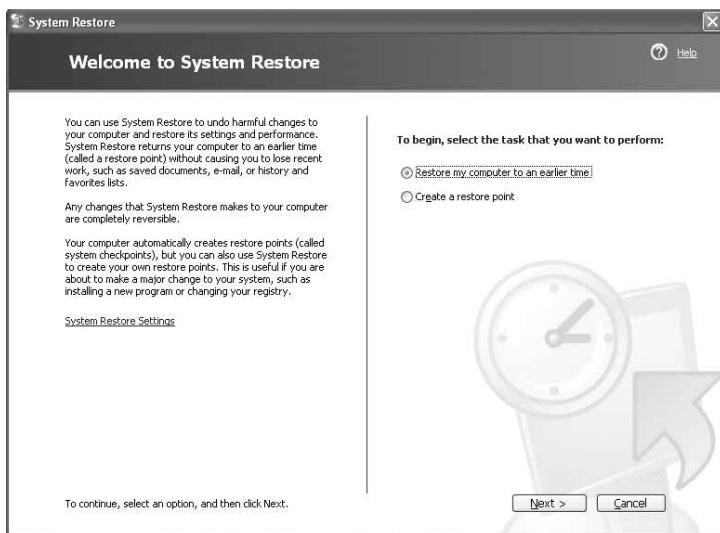


Figure 14-5 The System Restore tool

The System Restore tab of the System Properties applet is used to enable or disable the storage of restore points on a system-wide or drive-by-drive basis. The amount of space that can be consumed by the System Restore files can also be configured. If a drive is not configured to host restore information, any changes to files hosted by that drive won't be included in a restore point. Also, if there is not sufficient space, some files might not be included in the restore point, or the oldest existing restore point will be deleted.

Windows XP creates restore points automatically for a wide number of events, including:

- The first bootup
- Every 24 hours of calendar time or 24 hours of uptime
- The installation of an application through Install Shield or Windows Installer (note: some applications do not use either of these to manage their installation)
- Automatic updates
- Any restore operation using the backup tool
- Installing unsigned device drivers
- Any System Restore operation

The System Restore tool (found in Start | All Programs | Accessories | System Tools | System Restore) is a Wizard that walks you through the process of creating a new restore point or re-establishing an existing restore point.

The System Restore mechanism repairs the changes made by the installation of an application, but it does not delete the files associated with that application. You should use the Add or Remove Programs applet to uninstall an application if the application itself does not provide an uninstall function.

Recovery Console

Expert users and system administrators might want to use the Windows XP **Recovery Console** for more precise control over the troubleshooting and repair process (see Hands-on Projects 14-5 and 14-6). If you know which services or drivers might be causing the problem, instead of running the PC in Safe Mode, you can simply use the Recovery Console to disable those specific services or drivers. You can also use the Recovery Console to repair a corrupted Master Boot Record or to copy needed files to your PC from a floppy disk, CD-ROM, or a network share.

You can access the Recovery Console in one of two ways:

- From a command prompt, change directories to your Windows XP CD. Run `\i386\winnt32.exe\cmdcons` to install the Recovery Console. When you reboot your machine, you'll notice a new option for starting Windows XP Professional with the Recovery Console.
- Use the Windows XP CD or startup disks to start your computer. Select the Recovery Console option when you are prompted to choose repair options.

When the Recovery Console opens, you must specify the Windows XP client you want to log on-to and log on as Administrator. The commands available from the Recovery Console are listed below. To view the command-line parameters and uses for each of these commands, see “Recovery Console commands” in the Windows XP Professional online Help.

- *attrib*—Changes the attributes of a file or directory
- *batch*—Executes the commands specified in a text file
- *chdir (cd)*—Changes directories or displays the current directory name
- *chkdisk*—Checks and reports on the status of the disk
- *cls*—Starts Windows XP while logging all of the drivers and services that were and were not loaded during the boot process
- *copy*—Copies files
- *delete (del)*—Deletes files
- *dir*—Displays the directory structure
- *disable*—Disables a service or driver
- *diskpart*—Manages partitions
- *enable*—Enables or starts a service or driver
- *exit*—Exits the Recovery Console and restarts the computer
- *expand*—Extracts files from compressed files
- *fixboot*—Writes a new partition boot sector onto the system partition

- *fixmbr*—Repairs the Master Boot Record
- *format*—Formats a disk
- *help*—Displays a list of commands available in the Recovery Console
- *listsvc*—Lists the services available
- *logon*—Logs onto Windows XP
- *map*—Displays the drive letter mappings
- *mkdir (md)*—Creates a new folder
- *more*—Displays a text file
- *rmdir (rd)*—Deletes a folder
- *rename (ren)*—Renames a file
- *set*—Displays and sets console environment variables
- *systemroot*—Sets the current folder to the Systemroot folder

Emergency Repair Process

If your problem is caused by corrupt or missing system files, your startup environment, or your partition boot sector, you might want to use the emergency repair process. You must reboot your machine with the Windows XP Setup disks or the Windows XP Professional CD. Setup asks if you would like to install Windows XP. Press Enter to start the installation process. Then you are prompted whether you want to reinstall Windows XP or repair an existing version of Windows XP. Press R to repair Windows XP. Press R again to repair your system using the emergency repair process. You'll then have two options for repairing Windows XP:

- *Fast repair*—Requires no user interaction; automatically attempts to repair problems related to the Registry, system files, the boot volume, and your startup environment
- *Manual repair*—Enables the user to choose to repair the Registry, system files, the boot volume, or startup environment

If the emergency repair process is successful, the PC reboots automatically, and everything should be in working order again. As a last resort, if the emergency repair process cannot repair the system, you might consider reinstalling Windows XP. However, this method is time-consuming, and you might need to reinstall many of your applications and upgrades.

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Remote OS Installation

Administrators can also enable **remote OS installation**, which can be used along with the Microsoft IntelliMirror technologies to recover an entire PC, including a user's data, individual configurations, and applications. Remote OS installation is a component of

the optional Windows Server **Remote Installation Services (RIS)** (see Chapter 2, “Installing Windows XP Professional”), which allows a user to rebuild the computer’s entire image remotely across the network. No on-site technical support is necessary, minimizing both administrative costs and user downtime.

Client computers that can participate in a remote OS installation must have a **PXE (Pre-boot Execution)** environment. Network PCs and computers that comply with an industry-standard hardware guide called PC98 have this ROM. If a computer does not have the PXE remote-boot ROM, an RIS remote-boot disk can be used with a supported PCI-based network interface card (NIC). These client machines must also use a DHCP (Dynamic Host Configuration Protocol) server on the network.

When a user starts a client with either the PXE remote-boot ROM or an RIS remote-boot disk, the client can request an installation of Windows XP Professional from a remote RIS server. The server, in turn, provides one of the following types of installations:

- *CD-based*—Similar to installing the OS with a CD, but the source files are on another machine (the RIS server) on the network
- *Remote Installation Preparation (RIPrep) desktop image*—After installing Windows XP Professional, installing applications, and making configuration changes on one workstation, an administrator clones the image of that machine and replicates it on an RIS server. The entire **Remote Installation Preparation (RIPrep)** image can then be deployed to other workstations with remote OS installation.

Once the images are on the RIS server, the server can be used to install those images to any client that is remote-boot enabled. A user can initiate a network service boot by pressing the F12 key when booting up, at which time the RIS server installs the Client Installation Wizard. This Wizard uses Group Policies to give the user a list of available installation options from Active Directory. If there is only one installation option, the user is simply prompted with a confirmation screen, and the installation begins. Otherwise, the four installation options are:

- *Automatic Setup*—Prompts the user with a list of OS options if there is more than one OS installed, then an unattended installation begins
- *Custom Setup*—Allows the user to specify the computer name and the location where the computer account should reside in Active Directory
- *Restart a Previous Setup Attempt*—Restarts the remote OS installation process if a previous installation attempt failed
- *Maintenance and Troubleshooting*—Provides the user with access to third-party maintenance, pre-OS installation maintenance, and troubleshooting tools

CHAPTER SUMMARY

- ❑ IntelliMirror consists of a set of features within Windows XP utilizing user and group policies, folder redirection, and the Windows Installer Service (WIS) for backing up and restoring users' data, personalized settings, and applications.
- ❑ Windows XP includes built-in backup features. You should thoroughly understand the Backup utility and how it can be used to back up and restore a PC.
- ❑ You can use the emergency repair process or ASR to repair a system that has failed.
- ❑ You can use the System Restore feature to return the system to a previously saved state.
- ❑ You can use driver rollback to remove a bad driver and return to a previously functioning driver.
- ❑ You can rely upon WFP to keep your system files in working order.
- ❑ You can use Automatic Updates to keep your system in line with the latest patches from Microsoft.
- ❑ You can install and use the Recovery Console to recover user settings in the event of a system failure.
- ❑ You can use the Remote Installation Services (RIS) for a complete remote system restoration.

KEY TERMS

backup type — A backup configuration that determines how often data is backed up and how old and new files are handled. The types of backups are copy, daily, differential, incremental, and normal.

Backup utility — Windows XP's built-in tool that enables users to back up and restore their data and system configurations in case of a hardware or software failure.

copy backup — A method of backing up all selected files without marking them as being backed up.

daily backup — A method of backing up only the selected files that have been created or modified on the day that the backup is being performed. They are not marked as being backed up.

differential backup — A method of backing up selected files that have been created or modified since the last full backup. They are not marked as being backed up.

folder redirection — A component of IntelliMirror technologies that uses group policies to place specified user folders on a share on the network.

incremental backup — A method of backing up selected files that have been created or modified since the last normal or incremental backup. These files are marked as being backed up.

IntelliMirror — A set of features within Windows XP that utilizes policies, folder redirection, and the Windows Installer Service (WIS) for backing up and restoring users' data, personalized settings, and applications.

normal (or full) backup — A method of backing up all selected files and marking them as being backed up.

PXE (Pre-boot Execution) — A standard environment in PC98-compliant computers and network computers that can be used for a remote OS installation.

Recovery Console — A command-line interface that provides administrative tools useful for recovering a system that is not booting correctly.

remote OS installation — A component of Remote Installation Services (RIS) that can install Windows XP Professional on remote-boot-enabled PCs across a network.

Remote Installation Services (RIS) — An optional service in Windows Server that works with various other services to enable remote installations, including a remote operating system installation.

Remote Installation Preparation (RIPrep) — A type of installation used with remote OS installation whereby an administrator can take an entire image of one Windows XP Professional machine and install it onto other workstations. That image can include the OS as well as installed applications and configuration settings.

System State data — A collection of system-specific data that can be backed up and restored using the Windows XP Backup utility.

Windows Installer Service (WIS) — A Windows XP component that manages the installation and removal of applications by applying a set of centrally defined setup rules during the installation process.

REVIEW QUESTIONS

1. Which of the following types of media can be used to back up a user's data? (Choose all that apply.)
 - a. tape drives
 - b. external hard drives
 - c. logical drives
 - d. network shares
2. The Recovery Console can be used to stop and start services. True or False?
3. Which of the following could *not* participate in remote OS installation?
 - a. a network computer with no RIS remote boot disk
 - b. a PC with a PXE-based remote boot ROM, but with no RIS remote boot disk
 - c. a PC with an RIS remote boot disk, but with no PXE-based remote boot ROM
 - d. an undocked laptop with an RIS remote boot disk

4. Which of the following backup types backs up only the selected files that have been created or modified since the last normal or incremental backup? (Choose all that apply.)
- normal
 - daily
 - differential
 - incremental
5. Windows XP automatically records new restoration points at which of the following events?
- 24 hours of computer uptime
 - every logon
 - application installation through Install Shield
 - unsigned driver installation
6. Which of the following boot options is used to send debugging information from one computer to another on the network?
- Last Known Good Configuration
 - Safe Mode with networking
 - Enable boot logging
 - Debugging Mode
7. The WFP automatically protects core system files, which includes some font files. True or False?
8. Which of the following IntelliMirror technologies is associated with recovering a user's personal desktop settings?
- user data management
 - software installation
 - user setting management
 - user desktop management
9. Which of the following items are backed up when backing up the System State data, using the Backup utility? (Choose all that apply.)
- COM+ Class Registration database
 - Registry files
 - system boot files
 - the \system32 directory
10. Folder redirection is set up using the Synchronization Manager. True or False?

11. When the _____ repair option is run, the system automatically attempts to repair problems related to the Registry, system files, the boot volume, and the startup environment.
12. Which of the following backup types marks backed up files as being backed up? (Choose all that apply.)
 - a. copy
 - b. daily
 - c. differential
 - d. incremental
 - e. normal
13. Which of the following users can use the Backup utility to back up secured files on a Windows XP Professional computer? (Choose all that apply.)
 - a. a member of the Administrators group
 - b. a member of the Backup Operators group
 - c. any user that has Log On Locally rights
 - d. a member of the Backup utility group
14. Windows XP's Automatic Update is configured to install new updates automatically by default. True or False?
15. ASR is used to perform what action?
 - a. restore the entire system from backup initiated with a floppy
 - b. recover lost administrator passwords
 - c. restore system files required for booting
 - d. repair a damaged Registry
16. You can install the Recovery Console by using the WINNT32.exe program on the Windows XP CD with the _____ switch.
17. Driver Rollback is part of which Windows XP tool?
 - a. ASR
 - b. Device Manager
 - c. System Restore
 - d. Recovery Console
18. The Desktop Cleanup Wizard automatically launches every 30 days. True or False?
19. _____ can be used along with IntelliMirror technologies to recover an entire PC's image.
20. In order to use the Remote Installation Services (RIS), a machine must be a DHCP client. True or False?

21. Which of the following are types of installations that an RIS server can offer a client?
 - a. client-based
 - b. RIPrep desktop image
 - c. CD-based
 - d. network-based
22. A user can initiate a network service boot by pressing the _____ key when booting up.
23. When a client PC requests a remote OS installation, which of the following tools does an RIS server install first on the client?
 - a. Recovery Console
 - b. Client Installation Wizard
 - c. Windows XP Professional
 - d. PXE Remote Boot ROM
24. Which of the following setup options can an RIS server provide for a remote OS installation through the Client Installation Wizard? (Choose all that apply.)
 - a. Automatic Setup
 - b. Custom Setup
 - c. Restart a Previous Setup Attempt
 - d. Maintenance and Troubleshooting

HANDS-ON PROJECTS



Project 14-1

To enable your files to be synchronized with the network's copy of your files when you log off:

1. Open Synchronization Manager (**Start | All Programs | Accessories | Synchronize**).
2. Click **Setup**, then click the **Logon/Logoff** tab (see Figure 14-6).

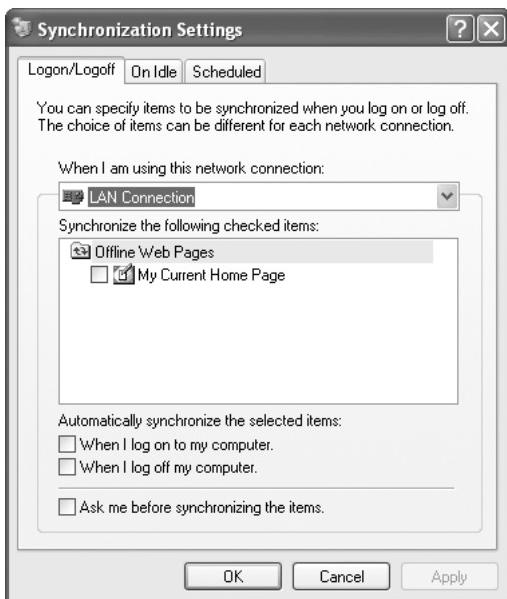


Figure 14-6 Synchronization Settings dialog box, Logon/Logoff tab

3. In the When I am using this network connection list, select the network connection you want to use.
4. In the Synchronize the following checked items list, select the files or folders you want to synchronize when you log onto and log off the network.
5. Under Automatically synchronize the selected items, select both **When I log on to my computer** and **When I log off my computer**.
6. Click **OK** to close the Synchronization Settings dialog box.
7. You can verify file synchronization by creating a document on your system, then logging off. Go to the server system or another client and check to see that the document was automatically stored on the network server.

Project 14-2



This hands-on project assumes the Control Panel is in Classic View.



To remove applications and repair applications:

1. Open the Control Panel (**Start | Control Panel**).
2. Double-click **Add or Remove Programs**.
3. Click the **Change or Remove Programs** button.

4. Follow the prompts to make the necessary changes.
5. Close any open dialog boxes or windows and the Add/Remove Programs applet. Restart your computer if prompted.



Project 14-3

To back up and restore the contents of your My Documents folder using the Windows Backup utility:

1. Select **Start | All Programs | Accessories | System Tools | Backup**.
2. If the tool launched in Wizard mode, click the **Advanced Mode** link to switch to the utility interface.
3. Click the **Backup** tab.
4. Check the box next to **My Documents**. Notice that a gray check mark automatically appears next to the drive containing My Documents and that the checkboxes next to each of the subdirectories under My Documents are automatically checked.
5. In the bottom-left corner, change path in the Backup media or file name field to **c:\backup.bkf**.
6. Look over your options, then click **Start Backup**.
7. When the backup is complete, click **Close** to exit the Backup Progress dialog box.
8. The Backup Job Information dialog box appears. Click **Start Backup**.

To restore your files, perform the following steps:

9. Click the **Restore and Manage Media** tab.
10. Expand the left pane listing of File to view the drive-level contents of the backup you just performed.
11. Mark one or more checkboxes beside folders or files within the backup.
12. Click **Start Restore**.
13. Click **OK** to initiate restore without viewing Advanced options.
14. Once the Restore is complete, close all dialog boxes and close the Backup utility.

14



Project 14-4

To schedule a backup of your My Documents folder, using the Windows Backup utility:

1. Select **Start | All Programs | Accessories | System Tools | Backup**.
2. If the Backup or Restore Wizard does not load, click **Tools**, then **Switch to Wizard Mode**.
3. The Backup Wizard Welcome screen is displayed. Click **Next**.
4. At the next screen, select the **Back up files and settings** radio button. Click **Next**.
5. Select the **My documents and settings** radio button. Click **Next**.

6. Click the **Browse** button to locate the drive and/or folder to store your backup. Type a name for this backup in the File name field, such as **backup.bkf**. Click **Save**, then click **Next**.
7. On the Completing the Backup or Restore Wizard page, click the **Advanced** button and select **Incremental** from the pull-down list. Click **Next**.
8. Read through your verification and compression options. Click **Next**.
9. Select **Replace the existing backups**. Notice that the option at the bottom is no longer dimmed. Check the checkbox so that only the owner and Administrator can access the backups. Click **Next**.
10. In the When to Back Up dialog box, choose **Later**.
11. In the Job name field, type **Daily Backup of My Documents**. Then click **Set Schedule**.
12. Under Schedule Task, choose **Daily** from the drop-down list and set the start time.
13. Click the **Settings** tab to review your options, but accept the defaults. Click **OK** to continue. Click **Next**.
14. When prompted for your account information, enter a user name and password of an Administrator or Backup Operator. Click **OK**.
15. Review your settings, and click **Finish** to schedule the backup.
16. Close the Backup utility.

Project 14-5

To install the Recovery Console:

1. From a Command Prompt (**Start|All Programs|Accessories|Command Prompt**), browse to the i386 folder of a Windows XP Professional CD.
2. Run **winnt32 /cmdcons**.
3. You are prompted by a Windows XP Setup dialog box explaining how to use the Recovery Console. Click **Yes** to install it.
4. The necessary files are copied to your system. When finished, click **OK**.
5. Choose **Start|Shutdown**. Choose **Restart** from the menu, and click **OK**.
6. When prompted, choose **Microsoft Windows Recovery Console** from the list of available operating systems and press **Enter**.
7. You are prompted for which operating system you'd like to log onto. Type the number for your operating system and press **Enter**.
8. You are then prompted for the local administrator password. Type that in. Press **Enter**.
9. Type **help** at the command prompt for a list of commands that you can use in the Recovery Console and press **Enter**.
10. Type **exit** and press **Enter** at the command prompt to exit and restart Windows. This time, choose your Windows XP operating system to boot up.





Project 14-6

To uninstall the Recovery Console:



Caution

Before continuing, copy your Boot.ini file and rename the copy Boot.bak. You can use this file later should the Boot.ini file become damaged. Be extra careful with the next step to make sure that you delete only the line for the Recovery Console. An incorrect Boot.ini file could keep your computer from restarting.

1. Double-click **My Computer**. Choose **Tools|Folder Options**. Click the **View** tab.
2. Click **Show hidden files and folders** and clear the **Hide protected operating system files** checkbox. Click **OK**.
3. Browse to the root directory and delete the **\cmdcons** folder and the file called **cmldr**.
4. Using Notepad (**Start|All Programs|Accessories|Notepad**), open the **boot.ini** file in the root directory. Remove the entry for the Recovery Console. For example, you would need to delete the last line in the following sample boot.ini file:

```
[boot loader]
timeout=10
default=multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
[operating systems]
multi(0)disk(0)rdisk(0)partition(1)\WINDOWS="Microsoft
Windows XP Professional" /fastdetect
C:\CMDCONS\BOOTSECT.DAT="Microsoft Windows Recovery
Console" /cmdcons
```

5. Save the file and close it.
6. Close any open windows.

CASE PROJECTS



1. You're in charge of backing up all of your organization's data stored on Windows XP Professional machines. Your organization consists of 2500 users, 500 of whom usually dial in from home. All of your users use Windows XP Professional. Which of the following backup methods will you use across your organization? Choose all that apply, and justify your choice(s).
 - a. tape backups
 - b. Zip drives
 - c. folder redirection
 - d. remote OS installation
2. Describe the three key features of IntelliMirror and a scenario for each feature that explains how that feature reduces the total cost of ownership (TCO).
3. Describe a situation in which it would make more sense to use the Recovery Console than the emergency repair process.